

of platinum. During the process of his memorable work upon the isolation of fluorine by the electrolysis of hydrofluoric acid containing hydrogen potassium fluoride, one of the most remarkable phenomena noticed was the rapidity with which the platinum rod forming the positive electrode was corroded by the action of the liberated gaseous fluorine. It was surmised that a fluoride of platinum was the product of this action, but hitherto all efforts to isolate such a body have proved unsuccessful. In fact, for a reason which will be discussed subsequently, it is impossible to prepare platinum fluoride in the wet way. M. Moissan has, however, been enabled to prepare anhydrous platinum fluoride by the action of pure dry fluorine itself upon the metal. It was found at the outset that, when fluorine is free from admixed vapour of hydrofluoric acid, it exerts no action whatever upon platinum, even when the latter is in a finely-divided state, and heated to 100°C . But when the temperature of the metal is raised to between 500° and 600°C ., combination readily occurs with formation of tetrafluoride of platinum and a small quantity of protofluoride. The moment the gas is mixed with a little vapour of hydrofluoric acid, the action is immensely accelerated, and then occurs readily at ordinary temperatures. The same rapid action occurs when platinum is placed in hydrofluoric acid saturated with free fluorine, which accounts for the disappearance of the positive terminal during the electrolysis. In order to prepare the fluoride of platinum, a bundle of wires of the metal is introduced into a thick platinum or fluor-spar tube, through which a current of fluorine gas from the electrolysis apparatus is passed. On heating the tube to low redness, the wires become rapidly converted to fluoride, when they are quickly transferred to a dry stoppered bottle. If the operation is performed in a platinum tube, a large quantity of fused fluoride remains in the tube. The tetrafluoride of platinum, PtF_4 , formed upon the wires, consists either of fused masses of a deep red colour, or of small buff-coloured crystals resembling anhydrous platinum chloride. It is exceedingly hygroscopic. With water it behaves in a most curious manner. With a small quantity of water it produces a fawn-coloured solution, which almost immediately becomes warm, and decomposes with precipitation of hydrated platonic oxide and free hydrofluoric acid. If the quantity of water is greater and the temperature low, the fawn-coloured solution may be preserved for a few minutes, at the expiration of which, or immediately on boiling the solution, the fluoride decomposes in the manner above indicated. This peculiar behaviour with water explains the impossibility of preparing the fluoride in the wet way. When the anhydrous fluoride is heated to bright redness in a platinum tube closed at one end, fluorine at once begins to be evolved as gas, and if a crystal of silicon be held at the mouth of the tube it takes fire and burns brilliantly in the gas. The residual platinum is found on examining the contents of the tube to consist of distinct crystals of the metal. Hence by far the most convenient method of preparing fluorine for lecture purposes is to form a considerable quantity of the fluoride first by passing the product of the electrolysis over bundles of platinum wire heated to low redness, and afterwards to heat the fluoride thus obtained to full redness in a platinum tube closed at one end. It only remains now to discover another method of preparing fluoride of platinum in the dry way, to be able to dispense with the expensive electrolysis apparatus altogether. M. Moissan has also prepared a fluoride of gold in the same manner. It is likewise very hygroscopic, decomposable by water, and yields gaseous fluorine on heating to redness.

SOCIETIES AND ACADEMIES.

LONDON.]

Royal Society, November 21.—“On the Local Paralysis of Peripheral Ganglia, and on the Connection of Different Classes of Nerve-Fibres with them.” By J. N. Langley, F.R.S., Fellow of Trinity College, and W. Lee Dickinson, Caius College, Cambridge.

We found that in the rabbit, 30 to 40 milligrams of nicotin injected into a vein stopped the effect of stimulating the sympathetic in the neck, not only on the pupil, but also on the vessels of the ear. It occurred to us that this action of nicotin might be due to a paralysis of the nerve-cells of the superior cervical ganglion, and not to a paralysis of the peripheral endings of the sympathetic nerve. On testing this view, we found that, after a certain dose of nicotin, stimulation of the

sympathetic fibres below the ganglion does not produce dilation of the pupil or constriction of the vessels of the ear, whilst stimulation of the sympathetic nerve-fibres above the ganglion produces these changes in the normal manner.

The method of action of nicotin can be tested in a more direct manner by local application to the isolated nerve and ganglion. When the sympathetic in the neck has been brushed over with a 1 per cent. solution of nicotin, stimulation of it produces the usual dilation of the pupil and constriction of the vessels of the ear; but when the superior cervical ganglion and the filaments proceeding from it have been brushed over with the 1 per cent. nicotin, stimulation of the sympathetic in the neck is found to be completely without effect, while stimulation of the filaments running from the ganglion to the carotid arteries produces the normal action.

Hence nicotin paralyzes the cells of the superior cervical ganglion.

On the fibres of the cervical sympathetic, which are vaso-motor for the head generally and secretory for the salivary glands, we have made a few experiments only; but so far we have been unable to detect any effect from stimulating the sympathetic in the neck after nicotin has been applied to the ganglion.

We conclude that *the dilator fibres for the pupil, the vaso-constrictor fibres for the ear (probably also those for the head generally), and the secretory fibres for the glands, end in the cells of the superior cervical ganglion.*

Ganglion of the Solar Plexus.—In the dog, cat, and rabbit, the splanchnic nerve on the left side runs to two chief ganglionic masses, which we may call respectively the celiac and superior mesenteric ganglia. The renal ganglia are scattered, but in the dog the chief one often lies underneath the supra-renal body, and in the cat the chief one is placed between the artery and vein about $\frac{1}{2}$ inch from the superior mesenteric ganglion.

To determine whether the inhibitory fibres of the splanchnic end in the nerve-cells of the solar plexus we proceeded as in the case of the superior cervical ganglion. Having ascertained that the application of 1 per cent nicotin to the splanchnic leaves its inhibitory power unaffected, we found that nicotin applied to the whole plexus at once abolishes the inhibitory power of the splanchnic; but inhibition can still be produced by stimulating the fibres proceeding from the ganglia. Hence, *the inhibitory fibres of the splanchnic end in the cells of the solar plexus.*

Our experiments are not sufficiently numerous, especially with regard to the connection of the celiac ganglion with the stomach, to make it certain that the one ganglion is entirely connected with fibres to the intestine, and the other with the fibres to the stomach; but we think they show that *in the main, and possibly altogether, the stomachic inhibitory fibres of the splanchnic nerve end in the cells of the celiac ganglion, and the intestinal inhibitory fibres of the splanchnic end in the cells of the superior mesenteric ganglion.*

We find, however, that *the motor fibres of the vagus for the stomach and intestines do not end in the nerve-cells of the solar plexus.*

The connection of the vaso-motor fibres of the splanchnic with the nerve-cells of the solar plexus can be determined by taking a tracing of the arterial blood-pressure and stimulating the splanchnic before and after the application of nicotin to the ganglia. By applying nicotin to both ganglia, the rise of blood-pressure caused by stimulating the splanchnic is reduced to very small limits, and by applying it to the renal plexus as well, the effect of splanchnic stimulation on the blood-pressure is abolished. Since in this case there is no fall of blood-pressure, we conclude that *the vaso-dilator as well as the vaso-constrictor fibres of the splanchnic end in the cells of the solar and renal plexuses.*

Combining oncometer observations on the dog with blood-pressure observations on the rabbit and cat, we think there is fair evidence that *the splanchnic vaso-motor fibres for the kidney end in the cells of the renal plexus.*

We have experimented upon various peripheral ganglia other than those mentioned above, and, though our results are as yet incomplete, with essentially similar results; that is, we have obtained an abolition of the effect of some one or more of the classes of nerve-fibres running to them. We think, then, there is fair ground to conclude that *by stimulating the nerve-fibres running to and those from any peripheral ganglion, before and after the application of dilute nicotin to it, the class of nerve-fibres which end in the nerve-cells of the ganglion can be distinguished from those which run through the ganglion without being connected with nerve-cells.*

Linnean Society, November 7.—Mr. W. Carruthers, F.R.S., President, in the chair.—Mr. H. Veitch and Rev. Prof. Henslow exhibited a beautiful series of East Indian hybrid rhododendrons, on which Prof. Henslow made some valuable remarks on the effects of cross-fertilization in regard to colour and alteration of structure, upon which some critical observations were made by Mr. Veitch, Prof. Bower, and Captain Elwes.—Mr. E. M. Holmes exhibited and made remarks upon some new British marine Algæ, describing their origin and affinities.—Dr. St. George Mivart, F.R.S., exhibited a drawing by a surgeon, who had been consulted as to amputation of a tail-like process in the human subject, being a prolongation of the coccyx to the extent of $4\frac{1}{2}$ centimetres. Dr. Mivart also exhibited a photograph, showing a remarkable resemblance between two arm stumps; one the result of an amputation, the other a congenital defect in the child of a nurse who had attended the patient whose arm was amputated. Both cases were commented on and explained by Dr. W. O. Priestley, and further remarks were offered by Dr. Murie, and Mr. W. Thiselton-Dyer.—Mr. W. B. Hemsley then read a paper by General Collett, C.B., and himself, on a collection of plants made in the Shan States, Upper Burmah. An interesting discussion followed, in which Messrs. J. G. Baker, C. B. Clarke, and Captain Elwes took part.

Anthropological Institute, November 12.—Dr. J. Beddoe, F.R.S., President, in the chair.—Dr. Beddoe read a paper on the natural colour of the skin in certain Oriental races. Dr. Beddoe's observations showed that the parts of the skin covered by clothing were very much lighter than those exposed to the sun and air; and that those people whose skin was the darkest in the covered parts, were not those who tanned to the blackest hue.—A paper by the Rev. James Macdonald was read on the manners, customs, superstitions, and religions of South African tribes.

PARIS.

Academy of Sciences, November 25.—M. Hermite in the chair.—On the November number of the *American Meteorological Journal*, by M. H. Faye. With this number begins the publication of a complete exposition of the author's theory of cyclonic movements, translated into English by Mrs. W. Harrington. The first part deals with storms, the second with tornadoes, while the third is occupied with the relations of tornadoes and storm phenomena to cyclones properly so called.—On animal heat, by M. Berthelot. In continuation of his previous paper on this subject, the author here discusses the question of the heat liberated by the action of oxygen on the blood. The quantity thus set free, referred to the molecular weight of oxygen ($O_2 = 32$ gr.), is found, by the extremely delicate experiments here described, to average 14.77 calories.—On the exhaustion of soils cultivated without manure, and on the value of the organic matter in the soil, by M. P. P. Delhérain. A series of experiments carried out at the Agricultural School of Grignon clearly shows that the substance chiefly lost by continuous cultivation without manure is carbon, the proportion of phosphoric acid, potash, and nitrogen eliminated being comparatively slight. It also appears that the organic matter itself is as important a fertilizing element for beetroot as are the nitrates, phosphates, or potash.—On the feno-secretory fibres, by M. Arloing. Experiments are described which demonstrate the existence of these fibres in the cervical chord of the large sympathetic nerve.—Observations on Swift's new comet (November 17) made at the Paris Observatory with the equatorial of the west tower, by M. G. Bigourdan. On November 21 the comet had the appearance of a very faint nebulosity (about $13'4$), nearly round, diameter about $50''$, without marked condensation. Observations made by Mdlle. D. Klumpke with the equatorial of the east tower on November 23 yielded similar results.—Generalization of Makeham's law of probabilities, by M. A. Quiquet. The chief property of Gompertz's formula as generalized by Makeham has been demonstrated in a very simple way by M. J. Bertrand. M. Quiquet in his turn now inquires whether this property may not itself be a particular case of a still more general principle, and whether the function discovered by the two eminent English actuaries may not therefore be capable of further generalization.—On the employment of electric conducting mediums in studying the displacements and distribution of acids with complex nature, by M. Daniel Berthelot. Of the numerous substances acting both as acid and as alkali one of the simplest is aspartic acid. The

author here studies the equilibria that are produced in the presence of this acid in diluted saline solutions. The measurements have been made with the Lippmann capillary electrometer, by M. Bouty's electrometric method.—Variations of the electric resistance of nitric peroxide at different temperatures, by M. J. J. Boguski. Measurements obtained by several methods lead to the conclusion that an increase of temperature of nitric peroxide produces an increase of its electric resistance, the most abrupt variations occurring between 0° and 17° C. Above 70° this acid forms an almost perfect insulator. During the process of heating two consecutive phenomena were observed which call for special attention. To a rise of temperature up to a given limit generally corresponds a static and definite increase of resistance; but this increase itself is preceded by a dynamic (passing) decrease of resistance, whose momentary value is at times no more than $\frac{1}{100}$ or $\frac{1}{2000}$ of the static and normal resistance.—Preparation and properties of the anhydrous platinous fluoride, by M. H. Moissan. In continuation of his previous researches, the author here shows that platinous fluoride, PtF_6 , decomposes water at the ordinary temperature, which accounts for the impossibility of preparing it by the wet process. At red heat it is decomposed into crystallized platinum and fluorine.—Contribution to the study of double decompositions between the halogen salts of mercury and zinc, by M. Raoul Varet. The author has studied (1) the action of cyanide of mercury on bromide of zinc; (2) the action of cyanide of zinc on bromide of mercury.—On a new sugar of the aromatic group, by M. Maquenne. To inosite and quercite, the only saccharine substances hitherto obtained from benzene, the author adds a third, provisionally named β -inosite, which he obtains from a pinité derived from the resin of *Pinus lambertiana*, of Nebraska.—Synthesis of metaphenylene-diamine, by M. Alphonse Seyewitz. The author has succeeded in effecting this synthesis by heating, to 280° or 300° C., a mixture of resorcin and calcium chloride under conditions here described.—Papers were submitted by MM. A. Béhal and Choay, on the action of heat on chloral-ammonia; by M. Raphael Dubois, on the mechanism of awakening in hibernating animals; by M. E. Couvreur, on the pulmonary circulation of the frog, as affected by the excitation of the pneumogastric nerve; by M. R. Moniez, on the larva of the new species *Tania Grimaldii*, a parasite of the dolphin; by MM. Appert and Henrivaux, on the devitrification of the ordinary glass of commerce; by MM. E. A. Martel and G. Gaupillat, on the formation of springs in the interior of the limestone plateaux of the *causses* of Languedoc; and by M. J. Thoulet, on the quantitative analysis of the fine sediment held in suspension in natural waters.

BERLIN.

Physiological Society, November 15.—Prof. du Bois-Reymond, President, in the chair.—After the appointment of officers for the year 1889–90, Dr. Virchow spoke on the spiracle gill of Selachians. With the assistance of drawings and a series of diagrams he discussed the varying arrangements and divisions of the blood-vessels which go to form the gills of Selachians; he also described the frequent occurrence, confined to certain regions of the head, of blood-vessels which are elaborately convoluted; the physiological significance of these vessels is quite unknown, but their morphological interest is so great that an extended investigation of them in other groups of animals is a matter of great importance. In all probability they are rudimentary structures, whose significance would be understood if the above extended investigations were carried out.—Dr. J. Munk spoke on the absorption of fats and fatty acids in the absence of bile in the intestine. The older classical experiments on animals with a biliary fistula had taught that, in the absence of bile, proteids and starch are digested as completely as in a normal animal, whereas, on the other hand, the absorption of fat is largely interfered with. In correspondence with this view, the later observers were of opinion that all fat which is not absorbed does not leave the body as neutral fat, but as fatty acids, and from this the conclusion was drawn that the fats of food are decomposed into fatty acids (and glycerin) before they are normally absorbed. The speaker had carried out a series of experiments on dogs with biliary fistulae, during the past summer, with a view to clearing up several obscure points in the whole question of the absorption of fats. After he had confirmed the older views as to the normal digestion of proteids and starch, and the appearance of unabsorbed fat in the form of free fatty acids in the faeces, he proceeded to determine quan-

tatively the absorption of fat from the intestine in the absence of bile. He found, first, that in such animals there is a relatively large absorption of fat from the alimentary canal as long as they receive the fat in company with proteids and starch, but that the absorption is much less when the fat is administered—as it was in the experiments of the older observers—mixed only with proteids. It was found that the animals absorbed more than 70 per cent. of such a fat as pig's lard, whose melting-point is low, without the assistance of bile; they also absorbed an almost proportionately large quantity of the free fatty acids of the lard, thus corresponding exactly to the behaviour of normal animals, which can absorb about 94–98 per cent. of any fat whose melting-point is low, whether it be administered in the form of neutral fat or of the fatty acids which it contains. When a fat was administered whose melting-point is high—especially such a fat as only begins to soften at the temperature of the body (*e.g.* mutton fat)—the amount absorbed was considerably less, and it was still less when the free fatty acids of this fat were given with the food. The speaker pointed out, with regard to the faeces of animals with a biliary fistula, that they may be dark-coloured, or even black, on a proteid diet, and only appear light-gray in colour when carbohydrates are given with the food. This dark colour is not, however, due to any derivative of the bile-pigments, but to hæmatin. The speaker had not been able to detect, with certainty, any further advanced decomposition of the contents of the intestine in animals with a biliary fistula, neither did he observe any increase of putrefactive products, such as indol, skatol, &c., in their urine.

In our report, last week (p. 95), of the meeting of the Berlin Physical Society on October 25 (first column, fifth line from foot), for “waves in air 21 metres long” read “waves in air 2 kilometres long.”

DIARY OF SOCIETIES.

LONDON.

THURSDAY, DECEMBER 5.

ROYAL SOCIETY, at 4.30.—Remarks on Mr. A. W. Ward's Paper on the Magnetic Rotation of the Plane of Polarization of Light in Doubly-Refracting Bodies: O. Wiener and W. Wedding.—Researches on the Chemistry of the Camphoric Acids: J. E. Marsh.—The Internal Friction of Iron, Nickel, and Cobalt, studied by means of Magnetic Cycles of very Minute Range: H. Tomlinson, F.R.S.—A Compound Wedge Photometer: Dr. Spitta.

LINNEAN SOCIETY, at 8.—Life History of a Stipitate Fresh-water Alga: G. Massee.—On the Anatomy of the Sand Grouse: G. Sim.

FRIDAY, DECEMBER 6.

PHYSICAL SOCIETY, at 5.—The Electrification of a Steam Jet: Shelford Bidwell, F.R.S.—Notes on Geometrical Optics, Part II.: Prof. S. P. Thompson.—On the Behaviour of Steel under Mechanical Stress: C. H. Carnus-Wilson.—On a Carbon Point in a Blake Telephone Transmitter: F. B. Hawes.

GEOLOGISTS' ASSOCIATION, at 8.—*Conversazione*.

SUNDAY, DECEMBER 8.

SUNDAY LECTURE SOCIETY, at 4.—The Wonders of the Yellowstone Park, the Recreation Ground of America; a Personal Narrative (with Oxyhydrogen Lantern Illustrations from the Lecturer's own Camera): Wm. Lant Carpenter.

MONDAY, DECEMBER 9.

SOCIETY OF ARTS, at 8.—Modern Developments of Bread-making: William Jago.

TUESDAY, DECEMBER 10.

ANTHROPOLOGICAL INSTITUTE, at 8.30.—The Natives of Mowab, Daudai, New Guinea: Edward Beardmore. Communicated by Prof. A. C. Haddon.—Fire-making in North Borneo: S. B. J. Skeritcheley.—On the Origin of the Eskimo: Dr. H. Rink.

INSTITUTION OF CIVIL ENGINEERS, at 8.—On the Triple-Expansion Engines and Engine Trials at the Owens College, Manchester: Prof. Osborne Reynolds, F.R.S. (Discussion.)

WEDNESDAY, DECEMBER 11.

SOCIETY OF ARTS, at 8.—The Paris Exhibition: H. Trueman Wood. ROYAL MICROSCOPICAL SOCIETY, at 8.—On the Freshwater Algæ and Schizophyceæ of Hampshire and Devon: A. W. Bennett.

THURSDAY, DECEMBER 12.

ROYAL SOCIETY, at 4.30. MATHEMATICAL SOCIETY, at 8.—On the Radial Vibrations of a Cylindrical Shell: A. B. Basset, F.R.S.—Note on 51840-Group: G. G. Morrice.—On the Flexure of an Elastic Plate: Prof. H. Lamb, F.R.S.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—Annual General Meeting.—Election of Council and Officers for 1890.—Electrical Engineering in America: G. L. Addenbrooke. (Discussion.)

FRIDAY, DECEMBER 13.

ROYAL ASTRONOMICAL SOCIETY, at 8. INSTITUTION OF CIVIL ENGINEERS, at 7.30.—Hydraulic Station and Machinery of the North London Railway, Poplar: John Hale.

BOOKS, PAMPHLETS, and SERIALS RECEIVED.

Giornale di Scienze Naturali ed Economiche, 1887 and 1888 (Palermo).—*Challenger* Report—Zoology, vol. xxxii (Eyre and Spottiswoode).—Collo-type and Photo-lithography: Dr. J. Schnauss; translated by E. C. Middleton (Liffle).—A Text book of Human Anatomy: Dr. A. MacAlister (Griffin).—A Naturalist in North Celebes: Dr. S. J. Hickson (Murray).—Algebra, Part 2: G. Chrystal (Edinburgh, Black).—A Hand-book of Modern Explosives: M. Eissler (Lockwood).—Contributions to Canadian Palæontology, vol. i., Part 2: J. F. Whiteaves (Montreal, Brown).—Modern Thought and Modern Thinkers: J. F. Charles (Relfe).—The Land of an African Sultan: W. B. Harris (L. W.).—Index of British Plants: R. Turnbull (Bell).—Manual for Beginners and for the London University Matriculation Examination.—The Anatomy of the Frog: Dr. A. Ecker; translated by Dr. G. Haslam (Oxford, Clarendon Press).—A Narrative of Travels on the Amazon and Rio Negro: A. R. Wallace (Ward, Lock).—Pawnee Hero Stories and Folk Tales: G. B. Grinnell (New York).—Palestine: Major Conder (Philip).—Tractatus de Globis: R. Hues; edited by C. R. Markham (Hakluyt Society).—Among Cannibals: C. Lumholtz (Murray).—Im Hochgebirge: Dr. E. Zsigmondy (Leipzig, Duncker and Humblot).—Niels Klein's Wallfahrt in die Unterwelt: L. Holberg; edited by E. H. Babbitt (Boston, Heath).—Practical Observations on Agricultural Papers, &c., 2nd edition: H. Wilson, Jun. (Simpkin).—Du Transformisme et de la Génération Spontanée: C. A. Rohant and Dr. M. Peter (Paris, Baillière).—Eingies über die Entstehung der Korallenriffe in der Javasee und Brantwunsbai, und über Neue Korallenbildung bei Krakatau: Dr. C. Ph. Sluiter (Batavia, Ernst).—Journal of the Royal Microscopical Society, October (Williams and Norgate).—The Asclepiad, No. 24, vol. vi.: Dr. Richardson (Longmans).—Proceedings of the Boston Society of Natural History, vol. xxiv., Parts 1 and 2 (Boston).—Journal of Morphology, vol. iii. No. 2 (Boston, Ginn).

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